What is claimed is:

1. An intravascular guidewire, comprising:

an elongate core wire comprising a metal; and

a polymer jacket comprising a shape memory polymer surrounding a portion of the core wire, the polymer jacket being more stiff than the portion of the core wire which it surrounds.

2. An intravascular guidewire as in claim 1, wherein the metal comprises a stainless steel metal.

3. An intravascular guidewire as in claim 1, wherein the metal comprises a super elastic metal.

4. An intravascular guidewire as in claim 3, wherein the super elastic metal comprises a nickel titanium alloy.

5. An intravascular guidewire as in claim 1, wherein the shape memory polymer comprises shape memory polyurethane.

6. An intravascular guidewire as in claim 1, wherein the shape memory polymer comprises shape memory polynorbornene or copolymers or blends thereof.

7. An intravascular guidewire as in claim 1, wherein the shape memory polymer comprises shape memory polycaprolactone or (oligo)caprolactone copolymer.

8. An intravascular guidewire as in claim 1, wherein the shape memory polymer comprises shape memory polymethylmethacylate.

9. An intravascular guidewire as in claim 1, wherein the shape memory polymer comprises shape memory PLLA copolymer.

10. An intravascular guidewire as in claim 1, wherein the shape memory polymer comprises shape memory PLLA PGA copolymer.

11. An intravascular guidewire as in claim 1, wherein the shape memory polymer comprises shape memory PL/D LA copolymer.

12. An intravascular guidewire as in claim 1, wherein the shape memory polymer comprises shape memory PMMA copolymer.

13. An intravascular guidewire as in claim 1, wherein the shape memory polymer comprises shape memory cross-linked polyethylene.

14. An intravascular guidewire as in claim 1, wherein the shape memory polymer comprises shape memory cross-linked polyisoprene.

15. An intravascular guidewire as in claim 1, wherein the shape memory polymer comprises shape memory styrene-butadiene copolymer.

16. An intravascular guidewire as in claim 1, wherein the shape memory polymer comprises a photocrosslinkable polymer.

17 15. A method of shaping a guidewire, comprising the steps of:

providing a guidewire comprising an elongate core wire with a shape memory polymer jacket surrounding a portion of the core wire;

deforming the polymer jacket and the portion of the core wire which it surrounds into a shape;

heating the deformed polymer jacket to a temperature at or above a glass transition temperature of the shape memory polymer; and

cooling the deformed polymer jacket to a temperature below the glass transition temperature of the shape memory polymer to maintain the shape.

18 16. A method of shaping a guidewire as in claim 15, further comprising the steps of:

deforming the polymer jacket and the portion of the core wire which it surrounds into a different shape;

reheating the deformed polymer jacket to a temperature at or above a glass transition temperature of the shape memory polymer; and

cooling the deformed polymer jacket to a temperature below the glass transition temperature of the shape memory polymer to maintain the different shape.

19 17. A method of shaping a guidewire as in claim 16, further comprising the steps of:

reheating the deformed polymer jacket to a temperature at or above a glass transition temperature of the shape memory polymer such that the guidewire returns to its original shape; and

cooling the deformed polymer jacket to a temperature below the glass transition temperature of the shape memory polymer.

20 18. An intravascular guidewire, comprising:

an elongate core wire comprising a metal having an elastic limit; and

a polymer jacket surrounding a distal tip portion of the core wire, the polymer jacket comprising a polymer having an elastic limit, the polymer jacket being more stiff than the distal tip portion of the core wire which it surrounds such that when the tip is deformed into a shape within the elastic limit of the metal and beyond the elastic limit of the polymer, the tip substantially retains the shape.

21 19. An intravascular guidewire as in claim 18, wherein the metal comprises a stainless steel metal.

220. An intravascular guidewire as in claim 18, wherein the metal comprises a super elastic metal.

2321. An intravascular guidewire as in claim 20, wherein the super elastic metal comprises a nickel titanium alloy.

2422. An intravascular guidewire as in claim 18, wherein the shape memory polymer comprises shape memory polyurethane.

2523. An intravascular guidewire as in claim 18, wherein the shape memory polymer comprises shape memory polynorbornene or copolymers or blends thereof.

2624. An intravascular guidewire as in claim 18, wherein the shape memory polymer comprises shape memory polycaprolactone or (oligo)caprolactone copolymer.

2725. An intravascular guidewire as in claim 18, wherein the shape memory polymer comprises shape memory polymethylmethacylate.

2826. An intravascular guidewire as in claim 18, wherein the shape memory polymer comprises shape memory PLLA copolymer.

29 27. An intravascular guidewire as in claim 18, wherein the shape memory polymer comprises shape memory PLLA PGA copolymer.

30 28. An intravascular guidewire as in claim 18, wherein the shape memory polymer comprises shape memory PL/D LA copolymer.

31 29. An intravascular guidewire as in claim 18, wherein the shape memory polymer comprises shape memory PMMA copolymer.

32 30. An intravascular guidewire as in claim 18, wherein the shape memory polymer comprises shape memory cross-linked polyethylene.

33 31. An intravascular guidewire as in claim 18, wherein the shape memory polymer comprises shape memory cross-linked polyisoprene.

34 32. An intravascular guidewire as in claim 18, wherein the shape memory polymer comprises shape memory styrene-butadiene copolymer.

35 33. An intravascular guidewire as in claim 18, wherein the shape memory polymer comprises a photocrosslinkable polymer.